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IMAGING VIGNETTE

Diagnosis of Infective Endocarditis After TAVR

Value of a Multimodality Imaging Approach

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DIAGNOSIS OF INFECTIVE ENDOCARDITIS (IE) AFTER TRANSCATHETER AORTIC VALVE REPLACEMENT (TAVR) remains difficult to establish using modified Duke criteria. We present the value of multi-imaging approach (European Society of Cardiology [ESC]-2015 modified criteria) (1) in 16 patients referred for TAVR-IE suspicion (**Figures 1 to 4,** Online Tables 1 and 2). The final diagnosis defined by an expert-team at 3 months of follow-up was definite-IE in 10, possible-IE in 1, and rejected-IE in 5. Echocardiography (n = 16) revealed major criteria in 5 patients (5 vegetations, 2 paravalvular lesions) (Online Table 3) and new regurgitation in only 1 of them (Online Figure 1). Leaflet thickening and increased mean gradient were observed respectively in 70% and 80% of definite-IE. Multislice computed tomography (CT) (n = 11) identified major criteria in 2 patients (1 abscess, 1 pseudoaneurysm, and 1 fistulae), but evidenced vegetation and leaflet thickening in 3 and 5 patients, respectively (Online Table 3). ^{18}F-fluorodeoxyglucose positron-emission tomography/CT (n = 15) was positive in 9, and ^{18}F-fluorodeoxyglucose uptake on transcatheter heart valve was observed in all patients with definite-IE, except 1 (Online Table 6).

Comparing the classification on admission and the final diagnosis, the multi-imaging approach (ESC-2015 modified criteria) presented with a higher diagnostic value (sensitivity = 100% for definite-IE diagnosis, $\kappa = 0.66$ for all classes) than the modified Duke criteria (sensitivity = 50%, $\kappa = 0.21$) (Online Figure 1, Online Tables 4 and 5).

To conclude, in TAVR-IE: 1) atypical lesions of leaflets thickening and high transvalvular gradient (obstructive pattern) are frequent. 2) Conventional modified Duke criteria have a low diagnostic value; while multi-imaging approach (ESC-2015 modified criteria) have an excellent sensitivity in this setting, thanks to the use of multimodality imaging (Online Figure 2).

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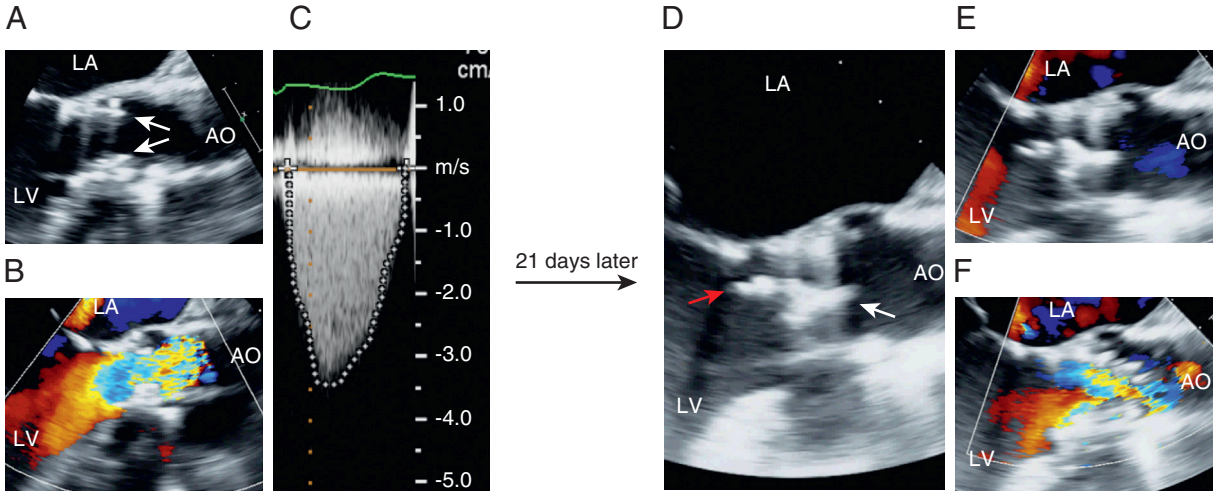
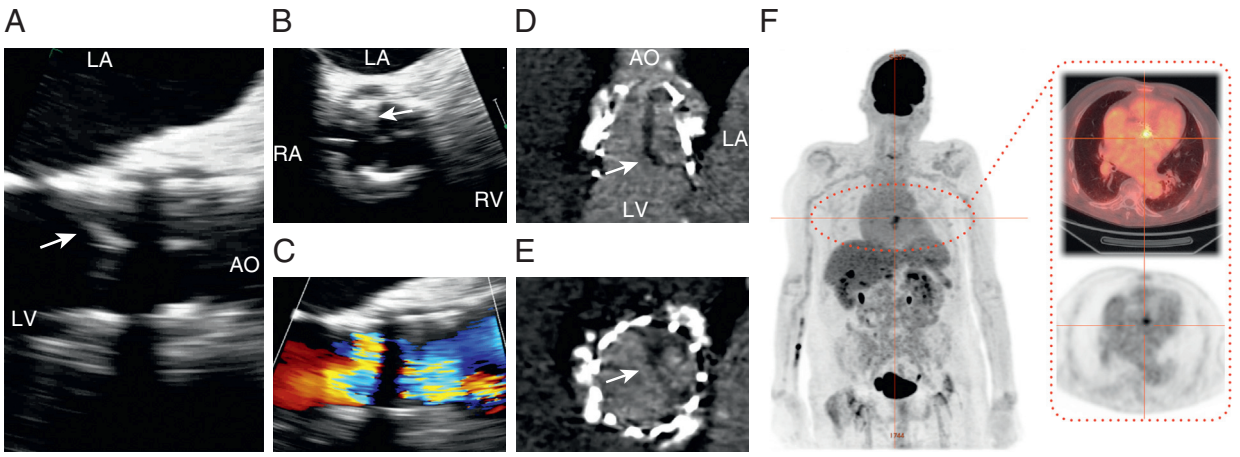
FIGURE 1 Obstructive Pattern in TAVR-IE



A 51-year-old man was admitted for a suspected-infective endocarditis (IE) 30 months after a transcatheter aortic valve replacement (TAVR) procedure with a 23-mm first-generation Edwards Sapien transcatheter heart valve (Edwards Lifesciences, Irvine, California). *Streptococcus bovis* was identified in blood cultures. First echocardiography only showed leaflets thickening **(white arrows in A),** highly turbulent jet in color Doppler **(B),** and high transvalvular mean gradient (27 mm Hg) **(C).** IE was possible according to the modified Duke criteria; however, positron-emission tomography/computed tomography showed ^{18}F-fluorodeoxyglucose uptake on the transcatheter heart valve and thus IE was definite according to the multi-imaging criteria (European Society of Cardiology 2015 modified criteria). Initial adapted antibiotic treatment was started. Repeated transesophageal echocardiography 3 weeks later found a large vegetation **(red arrow in D and E),** persistent leaflets thickening **(white arrow in D and E),** highly turbulent jet **(F),** and without significant regurgitation **(E).** The Endocarditis team decided to perform a surgical aortic valve replacement with a bioprosthesis, without post-operative complication and no relapse during the 3 years of follow-up. AO = aorta; LA = left atrium; LV = left ventricle.

FIGURE 2 Value of Multi-Imaging Approach in Doubtful Case of TAVR-IE



IE was suspected in an 80-year-old man with *S. anginosus* found in blood cultures, 8 months after 29-mm Edwards Sapien 3 implantation. Transesophageal echocardiography showed only leaflet thickening **(white arrow in A and B)** with moderate obstruction **(C)** (transvalvular mean gradient = 20 mm Hg). At the admission, IE was possible according to the modified Duke criteria. To complete the multi-imaging assessment, multislice computed tomography was performed and confirmed the abnormal leaflet thickening **(white arrow in D and E),** positron-emission tomography/computed tomography showed a ^{18}F-fluorodeoxyglucose uptake **(F)** on the transcatheter heart valve and an infective metastatic localization (lumbar spondylodiscitis). Thus the multi-imaging approach (European Society of Cardiology 2015 modified criteria) at admission was in agreement with the final diagnosis of definite-IE at the end of follow-up. Abbreviations as in Figure 1.